# SECTION I.—AEROLOGY.

## SOLAR AND SKY RADIATION MEASUREMENTS DURING MARCH, 1918.

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[Dated: Washington, D. C., April 30, 1918.]

For a description of instrumental exposures, and an account of the methods of obtaining and reducing the measurements, the reader is referred to the REVIEW for January, 1918, **46**: 2.

The monthly means and departures from normal values in Table 1 show that direct solar radiation intensities averaged slightly above normal at Madison, Wis., very close to normal at Lincoln, Nebr., and slightly below normal at Santa Fe, N. Mex., and Washington, D. C.

Table 3 shows an excess of radiation of a few per cent at all three stations, as compared with the normal radiation for the respective stations for March.

Skylight polarization measurements obtained at Washington on 11 days give a mean of 54 per cent with a maximum of 64 per cent on the 16th. These values are considerably below the average for Washington in March. Measurements obtained at Madison on five days after the 18th of the month give a mean of 66 per cent with a maximum of 71 per cent on the 22d.

On the 25th a peculiar and dense haze overspread the sky at Washington during the afternoon. At noon, with air mass 1.26 the radiation intensity was 1.37 calories. At 1 p. m. the sky polarization was 52 per cent. At 2 p. m., with air mass 1.60, the radiation intensity was 1.24 calories. The intensity then fell rapidly until 3 p. m., when it was only 0.54 calories with an air mass of 1.85. After that hour the haze diminished somewhat in density.

No cloud forms could be distinguished in this haze, but when first seen approaching the station from the west it had the appearance of a dense cloud bank on the horizon. There was more than the usual amount of haze in the atmosphere during the balance of the month.

TABLE 1.—*Solar radiation intensities during March, 1918.*

[Gram-calories per minute per square centimeter of normal surface.]

**Washington, D. C.**

| Date. | Sun's zenith distance. 0.0° | 48.3° | 60.0° | 66.5° | 70.7° | 73.6° | 75.7° | 77.4° | 78.7° | 79.8° |
|---|---|---|---|---|---|---|---|---|---|---|
| | Air mass. 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| A. M. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. |
| Mar. 2 | [1.41*] | 1.32 | 1.24 | 1.18 | 1.10 | 1.02 | 0.95 | 0.89 | ..... | 0.77 |
| 4 | ..... | ..... | ..... | ..... | ..... | 0.78 | ..... | ..... | 0.67 | ..... |
| 8 | ..... | 1.20 | 1.04 | 0.90 | 0.78 | 0.75 | 0.71 | 0.66 | 0.60 | ..... |
| 11 | ..... | 1.28 | 1.19 | 1.11 | 0.92 | ..... | ..... | 0.75 | 0.72 | 0.64 |
| 16 | ..... | 1.36 | 1.22 | 1.10 | 0.98 | 0.88 | 0.79 | ..... | ..... | ..... |
| 18 | ..... | 1.06 | 0.96 | 0.84 | 0.74 | 0.65 | 0.55 | ..... | ..... | ..... |
| 23 | ..... | 1.40 | 1.32 | 1.25 | 1.18 | ..... | 0.91 | ..... | ..... | ..... |
| 26 | ..... | ..... | ..... | 0.87 | 0.75 | 0.64 | ..... | 0.50 | 0.47 | 0.44 |
| 27 | ..... | 1.28 | 1.14 | ..... | ..... | ..... | 0.73 | 0.64 | 0.50 | ..... |
| 28 | ..... | 0.79 | 0.65 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 29 | [1.40*] | 1.31 | 1.22 | 1.10 | 1.03 | 0.96 | 0.90 | 0.84 | 0.79 | 0.74 |
| Monthly means | ..... | **1.22** | **1.11** | **1.04** | **0.94** | **0.81** | **0.79** | **0.71** | **0.62** | **0.65** |
| Departure from 10-year normal | ..... | **−0.06** | **−0.04** | **−0.01** | **−0.01** | **−0.05** | **−0.01** | **−0.04** | **−0.09** | **−0.04** |
| P. M. | | | | | | | | | | |
| Mar. 2 | ..... | ..... | 1.02 | 0.94 | 0.77 | ..... | ..... | ..... | ..... | ..... |
| 7 | ..... | 1.26 | 0.98 | 0.74 | ..... | 0.51 | 0.47 | ..... | ..... | ..... |
| 8 | ..... | 1.23 | 0.99 | 1.03 | 0.96 | 0.87 | 0.83 | 0.79 | ..... | ..... |
| 16 | ..... | 1.38 | 1.24 | 1.16 | 1.06 | 1.00 | 0.93 | 0.87 | ..... | ..... |
| 18 | ..... | 1.15 | 0.99 | 0.88 | 0.80 | 0.72 | 0.63 | 0.58 | 0.53 | ..... |
| 25 | ..... | 1.26 | 0.53 | 0.49 | 0.43 | 0.42 | ..... | ..... | ..... | ..... |
| 27 | ..... | 1.19 | 1.05 | 0.92 | 0.81 | 0.71 | 0.62 | 0.55 | ..... | ..... |
| 29 | [1.41*] | 1.29 | 1.18 | 1.08 | 0.99 | 0.90 | 0.82 | 0.74 | ..... | ..... |
| Monthly Means | ..... | **1.25** | **1.00** | **0.90** | **0.83** | **0.73** | **0.72** | **0.71** | **(0.53)** | ..... |
| Departure from 10-year normal | ..... | **−0.04** | **−0.13** | **−0.11** | **−0.09** | **−0.11** | **−0.07** | **−0.02** | **−0.14** | ..... |

* Extrapolated, and reduced to mean solar distance.

TABLE 1.—*Solar radiation intensities during March, 1918*—Continued.

**Madison, Wis.**

| Date. | Sun's zenith distance. 0.0° | 48.3° | 60.0° | 66.5° | 70.7° | 73.6° | 75.7° | 77.4° | 78.7° | 79.8° |
|---|---|---|---|---|---|---|---|---|---|---|
| | Air mass. 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| A. M. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. |
| Mar. 1 | ..... | ..... | 1.38 | 1.27 | ..... | ..... | ..... | 0.97 | ..... | ..... |
| 2 | ..... | ..... | 1.35 | 1.27 | 1.18 | 1.08 | 0.96 | ..... | ..... | ..... |
| 15 | ..... | 1.58 | 1.41 | ..... | ..... | 1.26 | ..... | ..... | ..... | ..... |
| 16 | ..... | ..... | 1.40 | 1.31 | 1.23 | 1.16 | ..... | ..... | ..... | ..... |
| 19 | ..... | ..... | 1.31 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 22 | ..... | ..... | 1.47 | 1.35 | ..... | ..... | ..... | ..... | ..... | ..... |
| 27 | ..... | ..... | 1.37 | 1.25 | 1.15 | ..... | ..... | ..... | ..... | ..... |
| 28 | ..... | 1.42 | 1.24 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Monthly means | ..... | **(1.50)** | **1.37** | **1.29** | **1.19** | **1.17** | **(0.96)** | **(0.97)** | ..... | ..... |
| Departures from 8-year normal | ..... | **+0.06** | **+0.03** | **+0.01** | **−0.02** | **+0.03** | **−0.10** | **−0.09** | ..... | ..... |
| P. M. | | | | | | | | | | |
| Mar. 1 | ..... | 1.54 | 1.40 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2 | ..... | ..... | 1.41 | 1.36 | 1.30 | 1.24 | ..... | ..... | ..... | ..... |
| 7 | ..... | ..... | 1.31 | 1.18 | ..... | ..... | ..... | ..... | ..... | ..... |
| 15 | ..... | 1.56 | 1.36 | 1.31 | 1.27 | 1.11 | ..... | ..... | ..... | ..... |
| 16 | ..... | 1.53 | 1.42 | ..... | 1.27 | 1.18 | 1.10 | 1.03 | ..... | ..... |
| 26 | ..... | 1.38 | 1.31 | 1.14 | 0.99 | ..... | ..... | ..... | ..... | ..... |
| 28 | ..... | 1.43 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Monthly means | ..... | **1.49** | **1.37** | **1.25** | **1.21** | **1.18** | **(1.10)** | **(1.03)** | ..... | ..... |
| Departures from 8-year normal | ..... | **+0.06** | **+0.01** | **−0.02** | **±0.00** | **−0.03** | **±0.00** | **−0.05** | ..... | ..... |

**Lincoln, Nebr.**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A. M. | | | | | | | | | | |
| Mar. 1 | ..... | 1.48 | 1.41 | 1.26 | 1.17 | 1.15 | 1.11 | ..... | ..... | ..... |
| 7 | ..... | ..... | 1.30 | 1.20 | 0.95 | 0.92 | 0.89 | 0.86 | 0.75 | ..... |
| 16 | ..... | 1.44 | 1.32 | 1.25 | 1.18 | 1.12 | ..... | ..... | ..... | ..... |
| 19 | ..... | 1.47 | 1.34 | 1.26 | 1.19 | 1.13 | 1.05 | 0.97 | ..... | ..... |
| 25 | ..... | 1.21 | 1.08 | 0.99 | 0.87 | 0.75 | ..... | ..... | ..... | ..... |
| 27 | ..... | 1.10 | 1.00 | 0.84 | 0.75 | 0.67 | ..... | ..... | ..... | ..... |
| Monthly means | ..... | **1.34** | **1.21** | **1.13** | **1.02** | **0.96** | **1.02** | **(0.92)** | **(0.75)** | ..... |
| Departure from 3-year normal | ..... | **+0.01** | **−0.01** | **+0.01** | **±0.00** | **+0.04** | **+0.09** | **−0.03** | ..... | ..... |
| P. M. | | | | | | | | | | |
| Mar. 1 | ..... | ..... | 1.33 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 16 | [1.48*] | 1.38 | 1.31 | 1.24 | 1.18 | 1.12 | 1.07 | ..... | 0.93 | 0.91 |
| 19 | ..... | 1.39 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 21 | ..... | 1.04 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 24 | ..... | 1.24 | 1.13 | 0.98 | 0.91 | 0.84 | 0.77 | ..... | 0.71 | 0.66 |
| 25 | ..... | 1.17 | 1.07 | 0.99 | 0.92 | 0.84 | 0.75 | 0.68 | 0.62 | ..... |
| Monthly means | ..... | **1.24** | **1.21** | **1.07** | **1.00** | **0.93** | **0.86** | **(0.68)** | **0.75** | **(0.78)** |
| Departure from 3-year normal | ..... | **−0.02** | **+0.02** | **−0.03** | **−0.03** | **−0.03** | **−0.02** | **−0.13** | **−0.06** | ..... |

**Santa Fe, N. Mex.**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A. M. | | | | | | | | | | |
| Mar. 1 | ..... | ..... | ..... | ..... | 1.23 | ..... | ..... | ..... | ..... | ..... |
| 4 | [1.50*] | 1.51 | 1.44 | 1.38 | ..... | ..... | ..... | ..... | ..... | ..... |
| 9 | ..... | 1.53 | 1.48 | 1.42 | 1.34 | ..... | ..... | ..... | ..... | ..... |
| 14 | ..... | ..... | ..... | 1.37 | ..... | ..... | ..... | ..... | ..... | ..... |
| 16 | ..... | 1.41 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 18 | ..... | 1.51 | 1.42 | 1.33 | ..... | ..... | ..... | ..... | ..... | ..... |
| 22 | ..... | 1.43 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 23 | ..... | 1.45 | 1.35 | 1.31 | 1.26 | 1.21 | 1.16 | ..... | 1.04 | ..... |
| 25 | ..... | 1.30 | ..... | 1.19 | 1.13 | 1.08 | 1.03 | 0.98 | ..... | ..... |
| Monthly means | ..... | **1.45** | **1.42** | **1.32** | **1.24** | **(1.14)** | **(1.10)** | **(0.98)** | **(1.04)** | ..... |
| Departure from 6-year normal | ..... | **−0.05** | **−0.04** | **−0.05** | **−0.08** | **−0.11** | **−0.10** | **−0.16** | **−0.06** | ..... |
| P. M. | | | | | | | | | | |
| Mar. 9 | ..... | 1.56 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 15 | [1.54*] | 1.47 | 1.38 | 1.30 | 1.23 | 1.15 | 1.08 | 1.02 | 0.96 | 0.91 |
| 16 | ..... | 1.47 | 1.41 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 18 | ..... | 1.55 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 22 | ..... | 1.43 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 23 | [1.43*] | 1.38 | 1.31 | 1.24 | 1.17 | 1.11 | 1.05 | 1.01 | ..... | 0.92 |
| 30 | ..... | 1.33 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Monthly means | ..... | **1.46** | **1.37** | **(1.27)** | **(1.20)** | **(1.13)** | **(1.06)** | **(1.02)** | **(0.96)** | **(0.92)** |
| Departure from 2-year normal | ..... | **±0.00** | **−0.01** | **−0.01** | **−0.03** | **−0.03** | **+0.03** | ..... | ..... | ..... |

* Extrapolated and reduced to mean solar distance.

TABLE 2.—*Vapor pressures at pyrheliometric stations on days when solar radiation intensities were measured.*

| Washington, D. C. | | | Madison, Wis. | | | Lincoln, Nebr. | | | Santa Fe, N. Mex. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dates. | 8 a.m. | 8 p.m. | Dates. | 8 a.m. | 8 p.m. | Dates. | 8 a.m. | 8 p.m. | Dates. | 8 a.m. | 8 p.m. |
| 1918. | *mm.* | *mm.* | 1918. | *mm.* | *mm.* | 1918. | *mm.* | *mm.* | 1918. | *mm.* | *mm.* |
| Mar. 2 | 3.15 | 4.57 | Mar. 1 | 1.96 | 3.15 | Mar. 1 | 2.26 | 4.37 | Mar. 1 | 2.36 | 4.17 |
| 4 | 3.39 | 4.75 | 2 | 3.45 | 3.15 | 7 | 2.26 | 2.87 | 4 | 3.45 | 3.81 |
| 7 | 6.02 | 3.00 | 7 | 2.26 | 3.63 | 16 | 2.87 | 3.53 | 9 | 3.15 | 3.15 |
| 8 | 3.45 | 3.15 | 15 | 1.32 | 2.26 | 19 | 2.49 | 3.63 | 14 | 2.26 | 2.16 |
| 11 | 1.78 | 3.15 | 16 | 2.62 | 4.17 | 21 | 6.50 | 3.81 | 15 | 2.49 | 2.26 |
| 16 | 2.49 | 3.45 | 19 | 3.45 | 5.79 | 24 | 3.63 | 3.81 | 16 | 2.36 | 2.16 |
| 18 | 3.81 | 5.36 | 22 | 3.15 | 3.30 | 25 | 3.15 | 3.63 | 18 | 2.62 | 1.96 |
| 23 | 3.63 | 3.99 | 26 | 3.30 | 3.30 | 27 | 3.81 | 5.79 | 22 | 3.00 | 4.05 |
| 25 | 6.02 | 1.68 | 27 | 3.00 | 2.74 | ..... | ..... | ..... | 23 | 3.81 | 4.37 |
| 26 | 2.62 | 2.26 | 28 | 3.15 | 4.57 | ..... | ..... | ..... | 25 | 3.45 | 3.99 |
| 27 | 2.49 | 3.15 | ..... | ..... | ..... | ..... | ..... | ..... | 30 | 4.37 | 3.15 |
| 28 | 3.45 | 3.81 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 29 | 3.63 | 4.37 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

TABLE 3.—*Daily totals and departures of solar and sky radiation during March, 1918.*

[Gram calories per square centimeter of horizontal surface.]

| Day of month. | Daily totals. | | | Departures from normal. | | | Excess or deficiency since first of month. | | |
|---|---|---|---|---|---|---|---|---|---|
| | Washington. | Madison. | Lincoln. | Washington. | Madison. | Lincoln. | Washington. | Madison. | Lincoln. |
| | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* |
| 1 | 72 | 443 | 464 | −223 | 145 | 113 | −223 | 145 | 113 |
| 2 | 428 | 397 | 412 | 129 | 95 | 58 | −94 | 240 | 171 |
| 3 | 467 | 414 | 131 | 165 | 107 | −227 | 71 | 347 | −56 |
| 4 | 185 | 179 | 365 | −121 | −132 | 4 | −50 | 215 | −52 |
| 5 | 365 | 139 | 114 | 56 | −176 | −251 | 6 | 39 | −303 |
| 6 | 251 | 125 | 294 | −61 | −193 | −74 | −55 | −154 | −377 |
| 7 | 368 | 408 | 435 | 53 | 86 | 65 | −2 | −68 | −312 |
| 8 | 443 | 165 | 310 | 125 | −160 | −63 | 123 | −228 | −375 |
| 9 | 76 | 16 | 205 | −245 | −312 | −170 | −122 | −540 | −545 |
| 10 | 293 | 455 | 468 | −31 | 123 | 90 | −153 | −417 | −455 |
| 11 | 457 | 331 | 430 | 130 | −1 | 50 | −23 | −421 | −405 |
| 12 | 84 | 350 | 430 | −246 | 12 | 47 | −269 | −409 | −358 |
| 13 | 41 | 35 | 203 | −292 | −306 | −182 | −561 | −715 | −540 |
| 14 | 47 | 239 | 256 | −289 | −105 | −132 | −850 | −820 | −672 |
| 15 | 419 | 526 | 445 | 80 | 179 | 55 | −770 | −641 | −617 |
| 16 | 521 | 534 | 502 | 180 | 184 | 109 | −590 | −457 | −508 |
| 17 | 370 | 456 | 472 | 26 | 104 | 77 | −564 | −353 | −431 |
| 18 | 467 | 419 | ..... | 121 | 61 | ..... | −443 | −289 | −431 |
| 19 | 415 | 472 | 541 | 66 | 114 | 142 | −377 | −175 | −289 |
| 20 | 412 | 424 | 371 | 61 | 64 | −31 | −316 | −111 | −320 |
| Pecade departure | | | | | | | **−163** | **+306** | **135** |
| 21 | 63 | 289 | 492 | −291 | −74 | 88 | −607 | −185 | −232 |
| 22 | 350 | 462 | 499 | −6 | 96 | 93 | −613 | −89 | −139 |
| 23 | 528 | 505 | 401 | 169 | 137 | −7 | −444 | 48 | −146 |
| 24 | 421 | 493 | 494 | 69 | 122 | 84 | −384 | 170 | −62 |
| 25 | 486 | 315 | 528 | 122 | −59 | 116 | −262 | 111 | 54 |
| 26 | 428 | 473 | 508 | 62 | 97 | 94 | −200 | 208 | 148 |
| 27 | 532 | 551 | 488 | 163 | 173 | 73 | −37 | 381 | 221 |
| 28 | 454 | 528 | 316 | 83 | 147 | −101 | 46 | 528 | 120 |
| 29 | 539 | 461 | 391 | 165 | 78 | −28 | 211 | 606 | 92 |
| 30 | 450 | 493 | 486 | 74 | 108 | 66 | 285 | 714 | 158 |
| 31 | 474 | 342 | 469 | 95 | −45 | 47 | 380 | 669 | 205 |
| Pecade departure | | | | | | | **+696** | **+780** | **+525** |
| Excess or deficiency since first of year.. | | | | | | | **+517** | **+1,538** | **−550** |
| | | | | | | | **+2.3** | **+6.7** | **−2.0** |

## A PROMISING CHEMICAL PHOTOMETER FOR PLANT PHYSIOLOGICAL RESEARCH.

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[MS. received by Weather Bureau, Apr. 10, 1918.]

Botanical literature is replete with references regarding the effect of light upon plants from the viewpoint of the physiologist, the anatomist, the histologist, the ecologist and the agriculturist. Numerous methods and instruments have been devised and used, and with some success, for the determination of the intensity or nature, or both, of the insolation of the plant under observation. So far as the writer is aware, all of these methods and instruments are possessed of objectionable limitations, either in reliability, initial cost, or cost of operation. It seems advisable, therefore, to call attention to a photometer which, at the present stage in its trial, at least indicates its practicability in connection with investigations of the light relations of plants. Allusion is had to the use of oxalic acid and uranium salts as advocated by Dr. Raymond F. Bacon.[1]

Through the courtesy of the United States Weather Bureau, and with the kind cooperation of Prof. H. H. Kimball of that bureau, some comparisons have been made of the records obtained by the Callender recording pyrheliometer with the results of exposure of the chemical photometer, with the idea of standardizing the latter.

In testing out the chemical photometer, the writer used uranium acetate and oxalic acid in the proportions of 1 part by weight of the former to 20 of the latter; that is, 5 cubic centimeters of a 1 per cent (0.023 molecular) aqueous solution of the uranium salt to 20 cubic centimeters of a 5 per cent (0.71 molecular) aqueous solution of the acid. (In most of his experiments Dr. Bacon used a proportion of 1 to 10. In the present tests, however, the amount of oxalic acid was increased in order that long exposures might be made.) The solutions were brought together in Florence flasks of 100 cubic centimeters capacity, plugged with loose wads of cotton,[2] and the flasks so adjusted in holes in a blackened board that the surface of the liquid in each flask was flush with the upper surface of the board, the neck of the flask being inclined to the north so that no shadow would be cast upon the liquid. This method of excluding the light from the sides of the flask was adopted in order that only the horizontal surface of the liquid would be exposed to the sunlight and thereby be more nearly comparable with the horizontally exposed receiving portion of the pyrheliometer. After exposure the oxalic-acid-uranium-acetate mixture was titrated with potassium permanganate (2N solution) in the following manner: The mixture was increased to a convenient volume for titration, either in the original flask or after having been transferred to a beaker, by the addition of distilled water. The volume to be titrated was then heated to 70° C., made strongly acid by the addition of 1:1 sulphuric acid and the potassium permanganate end point determined while the solution was still hot. Though Dr. Bacon states that he removed the uranium salt before titration by the addition of a slight excess of ammonium hydrate, the writer found that aliquots of the same solution gave no differences in the amount of oxalic acid present, whether the uranium was removed or not, and, therefore, did not use the ammonium hydrate. It was found that in cool weather a 10 per cent solution of oxalic acid became supersaturated, when the temperature dropped during the night, to such an extent that the stock bottle contained crystals the following morning when it was desired to make up fresh mixtures for exposure. Because of this fact it was necessary to use double the quantity of a 5 per cent oxalic acid solution.

A series of 13 comparisons of the chemical photometer with the pyrheliometer was run during the months of May and June, 1917. The length of exposure of the solution ranged from 8 to 24 hours, although in most cases the flasks were first exposed after dark in the evening and taken in after dark the next evening,

[1] *Bacon, R. F.* A solution of oxalic acid and uranium salts as a chemical photometer. Philip. jour. sci., A, Manila, 1910, 5: 281–303.

[2] The flasks could not be completely closed since Dr. Bacon says: "For all practical purposes the decomposition of oxalic acid under the influence of uranyl salts may be assumed to take place as follows: $H_2C_2O_4 \rightarrow CO_2 + CO + H_2O$." Some outlet, therefore, was necessary for the escape of the gases generated.—*Author.*